

## SEQUENCE LISTING

<110> University of Texas Health Science Center at San Antonio  
 Baseman, Joel  
 Kannan, Thirumalai

<120> METHODS AND COMPOSITIONS FOR MYCOPLASMA PNEUMONIAE EXOTOXINS

<130> 9237.10WO

<150> US 60/508,607

<151> 2003-10-03

<160> 76

<170> PatentIn version 3.2

<210> 1

<211> 591

<212> PRT

<213> Mycoplasma pneumoniae

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Met Pro Asn Pro Val Arg Phe Val Tyr Arg Val Asp Leu Arg Ser Pro  
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Glu Glu Ile Phe Glu His Gly Phe Ser Thr Leu Gly Asp Val Arg Asn  
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Phe Phe Glu His Ile Leu Ser Thr Asn Phe Gly Arg Ser Tyr Phe Ile  
 35 40 45

Ser Thr Ser Glu Thr Pro Thr Ala Ala Ile Arg Phe Phe Gly Ser Trp  
 50 55 60

Leu Arg Glu Tyr Val Pro Glu His Pro Arg Arg Ala Tyr Leu Tyr Glu  
 65 70 75 80

Ile Arg Ala Asp Gln His Phe Tyr Asn Ala Arg Ala Thr Gly Glu Asn  
 85 90 95

Leu Leu Asp Leu Met Arg Gln Arg Gln Val Val Phe Asp Ser Gly Asp  
 100 105 110

Arg Glu Met Ala Gln Met Gly Ile Arg Ala Leu Arg Thr Ser Phe Ala  
 115 120 125

Tyr Gln Arg Glu Trp Phe Thr Asp Gly Pro Ile Ala Ala Ala Asn Val  
 130 135 140

Arg Ser Ala Trp Leu Val Asp Ala Val Pro Val Glu Pro Gly His Ala

145		150		155		160
His His Pro Ala Gly Arg Val Val Glu Thr Thr Arg Ile Asn Glu Pro						
		165		170		175
Glu Met His Asn Pro His Tyr Gln Glu Leu Gln Thr Gln Ala Asn Asp						
		180		185		190
Gln Pro Trp Leu Pro Thr Pro Gly Ile Ala Thr Pro Val His Leu Ser						
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Ile Pro Gln Ala Ala Ser Val Ala Asp Val Ser Glu Gly Thr Ser Ala						
		210		215		220
Ser Leu Ser Phe Ala Cys Pro Asp Trp Ser Pro Pro Ser Ser Asn Gly						
		225		230		235
Glu Asn Pro Leu Asp Lys Cys Ile Ala Glu Lys Ile Asp Asn Tyr Asn						
		245		250		255
Leu Gln Ser Leu Pro Gln Tyr Ala Ser Ser Val Lys Glu Leu Glu Asp						
		260		265		270
Thr Pro Val Tyr Leu Arg Gly Ile Lys Thr Gln Lys Thr Phe Met Leu						
		275		280		285
Gln Ala Asp Pro Gln Asn Asn Asn Val Phe Leu Val Glu Val Asn Pro						
		290		295		300
Lys Gln Lys Ser Ser Phe Pro Gln Thr Ile Phe Phe Trp Asp Val Tyr						
		305		310		315
Gln Arg Ile Cys Leu Lys Asp Leu Thr Gly Ala Gln Ile Ser Leu Ser						
		325		330		335
Leu Thr Ala Phe Thr Thr Gln Tyr Ala Gly Gln Leu Lys Val His Leu						
		340		345		350
Ser Val Ser Ala Val Asn Ala Val Asn Gln Lys Trp Lys Met Thr Pro						
		355		360		365
Gln Asp Ile Ala Ile Thr Gln Phe Arg Val Ser Ser Glu Leu Leu Gly						
		370		375		380
Gln Thr Glu Asn Gly Leu Phe Trp Asn Thr Lys Ser Gly Gly Ser Gln						
		385		390		395
						400

His Asp Leu Tyr Val Cys Pro Leu Lys Asn Pro Pro Ser Asp Leu Glu  
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Glu Leu Gln Ile Ile Val Asp Glu Cys Thr Thr His Ala Gln Phe Val  
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Thr Met Arg Ala Ala Ser Thr Phe Phe Val Asp Val Gln Leu Gly Trp  
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Tyr Trp Arg Gly Tyr Tyr Tyr Thr Pro Gln Leu Ser Gly Trp Ser Tyr  
 450 455 460

Gln Met Lys Thr Pro Asp Gly Gln Ile Phe Tyr Asp Leu Lys Thr Ser  
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Lys Ile Phe Phe Val Gln Asp Asn Gln Asn Val Phe Phe Leu His Asn  
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Lys Leu Asn Lys Gln Thr Gly Tyr Ser Trp Asp Trp Val Glu Trp Leu  
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Lys His Asp Met Asn Glu Asp Lys Asp Glu Asn Phe Lys Trp Tyr Phe  
 515 520 525

Ser Arg Asp Asp Leu Thr Ile Pro Ser Val Glu Gly Leu Asn Phe Arg  
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His Ile Arg Cys Tyr Ala Asp Asn Gln Gln Leu Lys Val Ile Ile Ser  
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 580 585 590

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 <213> Mycoplasma pneumoniae

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Met Pro Asn Pro Val Arg Phe Val Tyr Arg Val Asp Leu Arg Ser Pro  
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Phe Phe Glu His Ile Pro Ser Thr Asn Phe Gly Arg Ser Tyr Phe Ile  
 35 40 45

Ser Thr Ser Glu Thr Pro Thr Ala Ala Ile Arg Phe Phe Gly Ser Trp  
 50 55 60

Leu Arg Glu Tyr Val Pro Glu His Pro Arg Arg Ala Tyr Leu Tyr Glu  
 65 70 75 80

Ile Arg Ala Asp Gln His Phe Tyr Asn Ala Arg Ala Thr Gly Glu Asn  
 85 90 95

Leu Leu Asp Leu Met Arg Gln Arg Gln Val Val Phe Asp Ser Gly Asp  
 100 105 110

Arg Glu Met Ala Gln Met Gly Ile Arg Ala Leu Arg Thr Ser Phe Ala  
 115 120 125

Tyr Gln Arg Glu Trp Phe Thr Asp Gly Pro Ile Ala Ala Ala Asn Val  
 130 135 140

Arg Ser Ala Trp Leu Val Asp Ala Val Pro Val Glu Pro Gly His Ala  
 145 150 155 160

His His Pro Ala Gly Arg Val Val Glu Thr Thr Arg Ile Asn Glu Pro  
 165 170 175

Glu Met His Asn Pro His Tyr Gln Glu Leu Gln Thr Gln Ala Asn Asp  
 180 185 190

Gln Pro Trp Leu Pro Thr Pro Gly Ile Ala Thr Pro Val His Leu Ser  
 195 200 205

Ile Pro Gln Ala Ala Ser Val Ala Asp Val Ser Glu Gly Thr Ser Ala  
 210 215 220

Ser Leu Ser Phe Ala Cys Pro Asp Trp Ser Pro Pro Ser Ser Asn Gly  
 225 230 235 240

Glu Asn Pro Leu Asp Lys Cys Ile Ala Glu Lys Ile Asp Asn Tyr Asn  
 245 250 255

Leu Gln Ser Leu Pro Gln Tyr Ala Ser Ser Val Lys Glu Leu Glu Asp

260	265	270
Thr Pro Val Tyr Leu Arg Gly Ile Lys Thr Gln Lys Thr Phe Met Leu		
275	280	285
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290	295	300
Lys Gln Lys Ser Pro Phe Pro Gln Thr Ile Phe Phe Trp Asp Val Tyr		
305	310	315
Gln Arg Ile Cys Leu Lys Asp Leu Thr Gly Ala Gln Ile Ser Leu Ser		
325	330	335
Leu Thr Ala Phe Thr Thr Gln Tyr Ala Gly Gln Leu Lys Val His Leu		
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Ser Val Ser Ala Val Asn Ala Val Asn Gln Lys Trp Lys Met Thr Pro		
355	360	365
Gln Asp Ser Ala Ile Thr Gln Phe Arg Val Ser Ser Glu Leu Leu Gly		
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Gln Thr Glu Asn Gly Leu Ser Trp Asn Thr Lys Ser Gly Gly Ser Gln		
385	390	395
His Asp Leu Tyr Val Cys Pro Leu Lys Asn Pro Pro Ser Asp Leu Glu		
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Glu Leu Gln Ile Ile Val Asp Glu Cys Thr Thr His Ala Gln Phe Val		
420	425	430
Thr Met Arg Ala Ala Ser Thr Phe Phe Val Asp Val Gln Leu Gly Trp		
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Tyr Trp Arg Gly Tyr Tyr Tyr Thr Pro Gln Leu Ser Gly Trp Ser Tyr		
450	455	460
Gln Met Lys Thr Pro Asp Gly Gln Ile Phe Tyr Asp Leu Lys Thr Ser		
465	470	475
Lys Ile Phe Phe Val Gln Asp Asn Gln Asn Val Phe Phe Leu His Asn		
485	490	495
Lys Leu Asn Lys Gln Thr Gly Tyr Ser Trp Asp Trp Val Glu Trp Leu		
500	505	510

Lys His Asp Met Asn Glu Asp Lys Asp Glu Asn Phe Lys Trp Tyr Phe  
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Ser Arg Asp Asp Leu Thr Ile Pro Ser Val Glu Gly Leu Asn Phe Arg  
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His Ile Arg Cys Tyr Ala Asp Asn Gln Gln Leu Lys Val Ile Ile Ser  
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Asn Val Glu Asp Lys Ile Leu Val Lys Asp Gly Phe Asp Arg Phe  
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<212> PRT  
<213> Mycoplasma pneumoniae

<400> 3

Met Pro Asn Pro Val Arg Phe Val Tyr Arg Val Asp Leu Arg Ser Pro  
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Phe Phe Glu His Ile Leu Ser Thr Asn Phe Gly Arg Ser Tyr Phe Ile  
35 40 45

Ser Thr Ser Glu Thr Pro Thr Ala Ala Ile Arg Phe Phe Gly Ser Trp  
50 55 60

Leu Arg Glu Tyr Val Pro Glu His Pro Arg Arg Ala Tyr Leu Tyr Glu  
65 70 75 80

Ile Arg Ala Asp Gln His Phe Tyr Asn Ala Arg Ala Thr Gly Glu Asn  
85 90 95

Leu Leu Asp Leu Met Arg Gln Arg Gln Val Val Phe Asp Ser Gly Asp  
100 105 110

Arg Glu Met Ala Gln Met Gly Ile Arg Ala Leu Arg Thr Ser Phe Ala  
115 120 125

Tyr Gln Arg Glu Trp Phe Thr Asp Gly Pro Ile Ala Ala Ala Asn Val  
 130 135 140

Arg Ser Ala Trp Leu Val Asp Ala Val Pro Val Glu Pro Gly His Ala  
 145 150 155 160

His His Pro Ala Gly Arg Val Val Glu Thr Thr Arg Ile Asn Glu Pro  
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Glu Met His Asn Pro His Tyr Gln Glu Leu Gln Thr Gln Ala Asn Asp  
 180 185 190

Gln Pro Trp Leu Pro Thr Pro Gly Ile Ala Thr Pro Val His Leu Ser  
 195 200 205

Ile Pro Gln Ala Ala Ser Val Ala Asp Val Ser Glu Gly Thr Ser Ala  
 210 215 220

Ser Leu Ser Phe Ala Cys Pro Asp Trp Ser Pro Pro Ser Ser Asn Gly  
 225 230 235 240

Glu Asn Pro Leu Asp Lys Cys Ile Ala Glu Lys Ile Asp Asn Tyr Asn  
 245 250 255

Leu Gln Ser Leu Pro Gln Tyr Ala Ser Ser Val Lys Glu Leu Glu Asp  
 260 265 270

Thr Pro Val Tyr Leu Arg Gly Ile Lys Thr Gln Lys Thr Phe Met Leu  
 275 280 285

Gln Ala Asp Pro Gln Asn Asn Asn Val Phe Leu Val Glu Val Asn Pro  
 290 295 300

Lys Gln Lys Ser Ser Phe Pro Gln Thr Ile Phe Phe Trp Asp Val Tyr  
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Gln Arg Ile Cys Leu Lys Asp Leu Thr Gly Ala Gln Ile Ser Leu Ser  
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 Glu Leu Gln Ile Ile Val Asp Glu Cys Thr Thr His Ala Gln Phe Val  
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 Tyr Trp Arg Gly Tyr Tyr Tyr Thr Pro Gln Leu Ser Gly Trp Ser Tyr  
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 Gln Met Lys Thr Pro Asp Gly Gln Ile Phe Tyr Asp Leu Lys Thr Ser  
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 Lys Ile Phe Phe Val Gln Asp Asn Gln Asn Val Phe Phe Leu His Asn  
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 Lys Leu Asn Lys Gln Thr Gly Tyr Ser Trp Asp Trp Val Glu Trp Leu  
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Phe Phe Glu His Ile Leu Ser Thr Asn Phe Gly Arg Ser Tyr Phe Ile  
 35 40 45

Ser Thr Ser Glu Thr Pro Thr Ala Ala Ile Arg Phe Phe Gly Ser Trp  
 50 55 60

Leu Arg Glu Tyr Val Pro Glu His Pro Arg Arg Ala Tyr Leu Tyr Glu  
 65 70 75 80

Ile Arg Ala Asp Gln His Phe Tyr Asn Ala Arg Ala Thr Gly Glu Asn  
 85 90 95

Leu Leu Asp Leu Met Arg Gln Arg Gln Val Val Phe Asp Ser Gly Asp  
 100 105 110

Arg Glu Met Ala Gln Met Gly Ile Arg Ala Leu Arg Thr Ser Phe Ala  
 115 120 125

Tyr Gln Arg Glu Trp Phe Thr Asp Gly Pro Ile Ala Ala Ala Asn Val  
 130 135 140

Arg Ser Ala Trp Leu Val Asp Ala Val Pro Val Glu Pro Gly His Ala  
 145 150 155 160

His His Pro Ala Gly Arg Val Val Glu Thr Thr Arg Ile Asn Glu Pro  
 165 170 175

Glu Met His Asn Pro His Tyr Gln Glu Leu Gln Thr Gln Ala Asn Asp  
 180 185 190

Gln Pro Trp Leu Pro Thr Pro Gly Ile Ala Thr Pro Val His Leu Ser  
 195 200 205

Ile Pro Gln Ala Ala Ser Val Ala Asp Val Ser Glu Gly Thr Ser Ala  
 210 215 220

Ser Leu Ser Phe Ala Cys Pro Asp Trp Ser Pro Pro Ser Ser Asn Gly  
 225 230 235 240

Glu Asn Pro Leu Asp Lys Cys Ile Ala Glu Lys Ile Asp Asn Tyr Asn  
245 250 255

Leu Gln Ser Leu Pro Gln Tyr Ala Ser Ser Val Lys Glu Leu Glu Asp  
260 265 270

Thr Pro Val Tyr Leu Arg Gly Ile Lys Thr Gln Lys Thr Phe Met Leu  
275 280 285

Gln Ala Asp Pro Gln Asn Asn Asn Val Phe Leu Val Glu Val Asn Pro  
290 295 300

Lys Gln Lys Ser Ser Phe Pro Gln Thr Ile Phe Phe Trp Asp Val Tyr  
305 310 315 320

Gln Arg Ile Cys Leu Lys Asp Leu Thr Gly Ala Gln Ile Ser Leu Ser  
325 330 335

Leu Thr Ala Phe Thr Thr Gln Tyr Ala Gly Gln Leu Lys Val His Leu  
340 345 350

Ser Val Ser Ala Val Asn Ala Val Asn Gln Lys Trp Lys Met Thr Pro  
355 360 365

Gln Asp Ser Ala Ile Thr Gln Phe Arg Val Ser Ser Glu Leu Leu Gly  
370 375 380

Gln Thr Glu Asn Gly Leu Phe Arg Asn Thr Lys Ser Gly Gly Ser Gln  
385 390 395 400

His Asp Leu Tyr Val Cys Pro Leu Lys Asn Pro Pro Ser Asp Leu Glu  
405 410 415

Glu Leu Gln Ile Ile Val Asp Glu Cys Thr Thr His Ala Gln Phe Val  
420 425 430

Thr Met Arg Ala Ala Ser Thr Phe Phe Val Asp Val Gln Leu Gly Trp  
435 440 445

Tyr Trp Arg Gly Tyr Tyr Tyr Thr Pro Gln Leu Ser Gly Trp Ser Tyr  
450 455 460

Gln Met Lys Thr Pro Asp Gly Gln Ile Phe Tyr Asp Leu Lys Thr Ser  
465 470 475 480

Lys Ile Phe Phe Val Gln Asp Asn Gln Asn Val Phe Phe Leu His Asn

485

490

495

Lys Leu Asn Lys Gln Thr Gly Tyr Ser Trp Asp Trp Val Glu Trp Leu  
500 505 510

Lys His Asp Met Asn Glu Asp Lys Asp Glu Asn Phe Lys Trp Tyr Phe  
515 520 525

Ser Arg Asp Asp Leu Thr Ile Pro Ser Val Glu Gly Leu Asn Phe Arg  
530 535 540

His Ile Arg Cys Tyr Ala Asp Asn Gln Gln Leu Lys Val Ile Ile Ser  
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Gly Ser Arg Trp Gly Gly Trp Tyr Ser Thr Tyr Asp Lys Val Glu Ser  
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Asn Val Glu Asp Lys Ile Leu Val Lys Asp Gly Phe Asp Arg Phe  
580 585 590

<210> 5  
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<212> PRT  
<213> Mycoplasma pneumoniae

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Phe Phe Glu His Ile Leu Ser Thr Asn Phe Gly Arg Ser Tyr Phe Ile  
35 40 45

Ser Thr Ser Glu Thr Pro Thr Ala Ala Ile Arg Phe Phe Gly Ser Trp  
50 55 60

Leu Arg Glu Tyr Val Pro Glu His Pro Arg Arg Ala Tyr Leu Tyr Glu  
65 70 75 80

Ile Arg Ala Asp Gln His Phe Tyr Asn Ala Arg Ala Thr Gly Glu Asn  
85 90 95

Leu Leu Asp Leu Met Arg Gln Arg Gln Val Val Phe Asp Ser Gly Asp  
100 105 110

Arg Glu Met Ala Gln Met Gly Ile Arg Ala Leu Arg Thr Ser Phe Ala  
 115 120 125

Tyr Gln Arg Glu Trp Phe Thr Asp Gly Pro Ile Ala Ala Ala Asn Val  
 130 135 140

Arg Ser Ala Trp Leu Val Asp Ala Val Pro Val Glu Pro Gly His Ala  
 145 150 155 160

His His Pro Ala Gly Arg Val Val Glu Thr Thr Arg Ile Asn Glu Pro  
 165 170 175

Glu Met His Asn Pro His Tyr Gln Glu Leu Gln Thr Gln Ala Asn Asp  
 180 185 190

Gln Pro Trp Leu Pro Thr Pro Gly Ile Ala Thr Pro Val His Leu Ser  
 195 200 205

Ile Pro Gln Ala Ala Ser Val Ala Asp Val Ser Glu Gly Thr Ser Ala  
 210 215 220

Ser Leu Ser Phe Ala Cys Pro Asp Trp Ser Pro Pro Ser Ser Asn Gly  
 225 230 235 240

Glu Asn Pro Leu Gly Lys Cys Ile Ala Glu Lys Ile Asp Asn Tyr Asn  
 245 250 255

Leu Gln Ser Leu Pro Gln Tyr Ala Ser Ser Val Lys Glu Leu Glu Asp  
 260 265 270

Thr Pro Val Tyr Leu Arg Gly Ile Lys Thr Gln Lys Thr Phe Met Leu  
 275 280 285

Gln Ala Asp Pro Gln Asn Asn Asn Val Phe Leu Val Glu Val Asn Pro  
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Lys Gln Lys Ser Ser Phe Pro Gln Thr Ile Phe Phe Trp Asp Val Tyr  
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Gln Arg Ile Cys Leu Lys Asp Leu Thr Gly Ala Gln Ile Ser Leu Ser  
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Leu Thr Ala Phe Thr Thr Gln Tyr Ala Gly Gln Leu Lys Val His Leu  
 340 345 350

Ser Val Ser Ala Val Asn Ala Val Asn Gln Lys Trp Lys Met Thr Pro  
 355 360 365

Gln Asp Ser Ala Ile Thr Gln Phe Arg Val Ser Ser Glu Leu Leu Gly  
 370 375 380

Gln Thr Glu Asn Gly Leu Phe Trp Asn Thr Lys Ser Gly Gly Ser Gln  
 385 390 395 400

His Asp Leu Tyr Val Cys Pro Leu Lys Asn Pro Pro Ser Asp Leu Glu  
 405 410 415

Glu Leu Gln Ile Ile Val Asp Glu Cys Thr Thr His Ala Gln Phe Val  
 420 425 430

Thr Met Arg Ala Ala Ser Thr Phe Phe Val Asp Val Gln Leu Gly Trp  
 435 440 445

Tyr Trp Arg Gly Tyr Tyr Tyr Thr Pro Gln Leu Ser Gly Trp Ser Tyr  
 450 455 460

Gln Met Lys Thr Pro Asp Gly Gln Ile Phe Tyr Asp Leu Lys Thr Ser  
 465 470 475 480

Lys Ile Phe Phe Val Gln Asp Asn Gln Asn Val Phe Phe Leu His Asn  
 485 490 495

Lys Leu Asn Lys Gln Thr Gly Tyr Ser Trp Asp Trp Val Glu Trp Leu  
 500 505 510

Lys His Asp Met Asn Glu Asp Lys Asp Glu Asn Phe Lys Trp Tyr Phe  
 515 520 525

Ser Arg Asp Asp Leu Thr Ile Pro Ser Val Glu Gly Leu Asn Phe Arg  
 530 535 540

His Ile Arg Cys Tyr Ala Asp Asn Gln Gln Leu Lys Val Ile Ile Ser  
 545 550 555 560

Gly Ser Arg Trp Gly Gly Trp Tyr Ser Thr Tyr Asp Lys Val Glu Ser  
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Asn Val Glu Asp Lys Ile Leu Val Lys Asp Gly Phe Asp Arg Phe  
 580 585 590

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 <212> PRT  
 <213> Artificial

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Phe Phe Glu His Ile Pro Ser Thr Asn Phe Gly Arg Ser Tyr Phe Ile  
 35 40 45

Ser Thr Ser Glu Thr Pro Thr Ala Ala Ile Arg Phe Phe Gly Ser Trp  
 50 55 60

Leu Arg Glu Tyr Val Pro Glu His Pro Arg Arg Ala Tyr Leu Tyr Glu  
 65 70 75 80

Ile Arg Ala Asp Gln His Phe Tyr Asn Ala Arg Ala Thr Gly Glu Asn  
 85 90 95

Leu Leu Asp Leu Met Arg Gln Arg Gln Val Val Phe Asp Ser Gly Asp  
 100 105 110

Arg Glu Met Ala Gln Met Gly Ile Arg Ala Leu Arg Thr Ser Phe Ala  
 115 120 125

Tyr Gln Arg Glu Trp Phe Thr Asp Gly Pro Ile Ala Ala Ala Asn Val  
 130 135 140

Arg Ser Ala Trp Leu Val Asp Ala Val Pro Val Glu Pro Gly His Ala  
 145 150 155 160

His His Pro Ala Gly Arg Val Val Glu Thr Thr Arg Ile Asn Glu Pro  
 165 170 175

Glu Met His Asn Pro His Tyr Gln Glu Leu Gln Thr Gln Ala Asn Asp  
 180 185 190

Gln Pro Trp Leu Pro Thr Pro Gly Ile Ala Thr Pro Val His Leu Ser  
 195 200 205

Ile Pro Gln Ala Ala Ser Val Ala Asp Val Ser Glu Gly Thr Ser Ala  
 210 215 220

Ser Leu Ser Phe Ala Cys Pro Asp Trp Ser Pro Pro Ser Ser Asn Gly  
 225 230 235 240

Glu Asn Pro Leu Gly Lys Cys Ile Ala Glu Lys Ile Asp Asn Tyr Asn  
 245 250 255

Leu Gln Ser Leu Pro Gln Tyr Ala Ser Ser Val Lys Glu Leu Glu Asp  
 260 265 270

Thr Pro Val Tyr Leu Arg Gly Ile Lys Thr Gln Lys Thr Phe Met Leu  
 275 280 285

Gln Ala Asp Pro Gln Asn Asn Asn Val Phe Leu Val Glu Val Asn Pro  
 290 295 300

Lys Gln Lys Pro Ser Phe Pro Gln Thr Ile Phe Phe Trp Asp Val Tyr  
 305 310 315 320

Gln Arg Ile Cys Leu Lys Asp Leu Thr Gly Ala Gln Ile Ser Leu Ser  
 325 330 335

Leu Thr Ala Phe Thr Thr Gln Tyr Ala Gly Gln Leu Lys Val His Leu  
 340 345 350

Ser Val Ser Ala Val Asn Ala Val Asn Gln Lys Trp Lys Met Thr Pro  
 355 360 365

Gln Asp Ser Ala Ile Thr Gln Phe Arg Val Ser Ser Glu Leu Leu Gly  
 370 375 380

Gln Thr Glu Asn Gly Leu Ser Arg Asn Thr Lys Ser Gly Gly Ser Gln  
 385 390 395 400

His Asp Leu Tyr Val Cys Pro Leu Lys Asn Pro Pro Ser Asp Leu Glu  
 405 410 415

Glu Leu Gln Ile Ile Val Asp Glu Cys Thr Thr His Ala Gln Phe Val  
 420 425 430

Thr Met Arg Ala Ala Ser Thr Phe Phe Val Asp Val Gln Leu Gly Trp  
 435 440 445

Tyr Trp Arg Gly Tyr Tyr Tyr Thr Pro Gln Leu Ser Gly Trp Ser Tyr

450	455	460	
Gln Met Lys Thr Pro Asp Gly Gln Ile Phe Tyr Asp Leu Lys Thr Ser			
465	470	475	480
Lys Ile Phe Phe Val Gln Asp Asn Gln Asn Val Phe Phe Leu His Asn			
	485	490	495
Lys Leu Asn Lys Gln Thr Gly Tyr Ser Trp Asp Trp Val Glu Trp Leu			
	500	505	510
Lys His Asp Met Asn Glu Asp Lys Asp Glu Asn Phe Lys Trp Tyr Phe			
	515	520	525
Ser Arg Asp Asp Leu Thr Ile Pro Ser Val Glu Gly Leu Asn Phe Arg			
	530	535	540
His Ile Arg Cys Tyr Ala Asp Asn Gln Gln Leu Lys Val Ile Ile Ser			
	545	550	555
Gly Ser Arg Trp Gly Gly Trp Tyr Ser Thr Tyr Asp Lys Val Glu Ser			
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Asn Val Glu Asp Lys Ile Leu Val Lys Asp Gly Phe Asp Arg Phe			
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 <212> DNA  
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acgtgaatgg tttaccgatg gtccaattgc agcagctaata gtccgtagtg cttgactagt	480
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tactagaatt aatgaaccgg aaatgcacaa ccctcattat caagagctgc aaaccaagc	600



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caatgatcaa ccatgattgc caacaccagg aatagctact cctgtacatt tatcaattcc      660
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cgtgttcttt ctccataata aactcaaca acaaactggg tacagctggg attgagtaga     1560
atggctaaaa catgacatga atgaggacaa agacgaaaac tttaaaggt acttttcgcg     1620
tgatgacctt accattcctt ccgttgaagg gcttaacttc cgccacattc gctgttacgc     1680
tgacaaccag cagttaaagg tgatcataag cggttcacgt tggggcgggt ggtactccac     1740
ttacgataaa gttgaaagta atgtcgaaga taagattttg gtcaaagatg gttttgatcg     1800
cttttagcga ttaagcttta acgtcactgt tttgctctaa tgttagaagc aaagatcttg     1860

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&lt;210&gt; 8

&lt;211&gt; 1773

&lt;212&gt; DNA

&lt;213&gt; Artificial

&lt;220&gt;

<223> S1 nucleotide sequence with tga codons changed to tgg for expression in E. coli

&lt;400&gt; 8

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atgccaaatc ctggttagatt tgtttaccgt gttgatttga gaagccctga agaaattttt      60
gaacatggct tttcaacttt aggtgatgtg agaaatttct ttgaacacat tccctccact     120
aattttggta gaagctatct tatttccact tcagaaacac ccacagcagc tattcgcttc     180
tttggtagct gggttacggga atatgtacca gagcacccca gaagggtta cttatatgaa     240

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attcgtgccg accaactt ttacaatgcc cgcgccactg gggagaactt gttagattta 300
atgctgcaaa gacaagtagt atttgactct ggtgatcgag aaatggcaca aatgggaatt 360
agagctttac gcacttcctt tgcgtatcaa cgtgaatggg ttaccgatgg tccaattgca 420
gcagctaata tccgtagtgc ttggctagta gatgctgttc ccgttgaacc tggatcatgct 480
caccacccgg ctggctggtg tgtagagact actagaatta atgaaccgga aatgcacaac 540
cctcattatc aagagctgca aacccaagcc aatgatcaac catggttgcc aacaccagga 600
atagctactc ctgtacattt atcaattccc caagcagctt ccgttgctga tgtttcggaa 660
ggtacttccg cttcgtatc gtttgcgtgc cctgattgga gtccaccttc tagtaatggt 720
gaaaatccgc tagacaaatg cattgcggaa aagattgata actataacct acaatcctta 780
ccacagtacg ctagcagtgt aaaggaactg gaagatacac cagtatacct aaggggaatt 840
aaaacgcaaa aaacctttat gttacaagca gatccgcaaa ataacaatgt ctttttggtc 900
gaagtaaacc ccaaacaaaa gccagcttt ccccaaacca tcttcttttg ggatgtttat 960
caacgaattt gtctcaagga tttaactggt gcacaaatca gtctttcgct tactgccttt 1020
actactcagt atgctggtca gctcaaagtg caccttagtg ttagcgcggg taatgccgtg 1080
aaccaaaagt ggaaaatgac accgcaagac agtgcaataa ctcagtttcg ggtctcctct 1140
gaactgttag gtcaaaactga aaatggcttg tcctggaata ccaagagtgg tggttcacia 1200
cacgatttgt atgtatgtcc ttgaaaaat ccacctagtg atttggaaga attacaaata 1260
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ggttggtctt atcagatgaa aacaccagat ggacagatat tctatgatct aaaaacttcg 1440
aaaatcttct ttgtccagga caacaaaaac gtgttctttc tccataataa actcaacaaa 1500
caaactggtt acagctggga ttgggtagaa tggctaaaac atgacatgaa tgaggacaaa 1560
gacgaaaact ttaaattgga cttttcgcgt gatgacctta ccattccttc cgttgaaggg 1620
cttaacttcc gccacattcg ctgttacgct gacaaccagc agttaaaggt gatcataagc 1680
ggttcacgtt ggggcggttg gtactccact tacgataaag ttgaaagtaa tgtcgaagat 1740
aagattttgg tcaaagatgg ttttgatcgc ttt 1773

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<210> 9

<211> 1773

<212> DNA

<213> Artificial

<220>

<223> L2 nucleotide sequence with tga codons changed to tgg for expression in E. Coli

<400> 9  
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 aattttggta gaagctatTTt tatttccact tcagaaacac ccacagcagc tattecgcttc 180  
 tttggtagct ggttacggga atatgtacca gagcaccCCA gaagggttga cttatatgaa 240  
 attcgtgccg accaactctt ttacaatgcc cgcgccactg gggagaactt gttagattta 300  
 atgcgtcaaa gacaagtagt atttgactct ggtgatcgag aaatggcaca aatgggaatt 360  
 agagctttac gcacttcctt tgcgtatcaa cgtgaatggg ttaccgatgg tccaattgca 420  
 gcagctaattg tccgtagtgc ttggctagta gatgctgttc ccgttgaacc tggatcatgct 480  
 caccacccgg ctggtcgtgt tgtagagact actagaatta atgaaccgga aatgcacaac 540  
 cctcattatc aagagctgca aaccaagcc aatgatcaac catgggttgc aacaccagga 600  
 atagctactc ctgtacattt atcaattccc caagcagctt ccgttgctga tgtttcggaa 660  
 ggtacttccg cttcgctatc gtttgctgct cctgattgga gtccaccttc tagtaatggg 720  
 gaaaatccgc taggcaaagc cattgcggaa aagattgata actataacct acaatcctta 780  
 ccacagtacg ctagcagtgt aaaggaactg gaagatacac cagtatacct aaggggaatt 840  
 aaaacgcaaa aaacctttat gttacaagca gatccgcaaa ataacaatgt ctttttggtc 900  
 gaagtaaacc ccaaacaaaa gtccagcttt ccccaaacca tcttcttttg ggatgtttat 960  
 caacgaattt gtctcaagga ttttaactggg gcacaaatca gtctttcgct tactgccttt 1020  
 actactcagt atgctggcca gctcaaagtg caccttagtg ttagcgcggg taatgccgtg 1080  
 aaccaaagt ggaaaatgac accgcaagac agtgcaataa ctcagtttcg ggtctcctct 1140  
 gaactgtag gtcaaactga aaatggcttg ttctggaata ccaagagtgg tggttcacia 1200  
 cagatttgt atgtatgtcc tttgaaaaat ccacctagtg atttggaaga attacaaata 1260  
 attgttgatg aatgtactac ccatgcgcag tttgttacta tgcgtgcagc tagcaccttc 1320  
 tttgttgatg ttcagctagg ctggtattgg aggggttatt actatacccc acaattaagt 1380  
 ggttggctct atcagatgaa aacaccagat ggacagatat tctatgatct aaaaacttcg 1440  
 aaaatcttct ttgtccagga caacaaaaac gtgttctttc tccataataa actcaacaaa 1500  
 caaactggtt acagctggga ttgggtagaa tggctaaaac atgacatgaa tgaggacaaa 1560  
 gacgaaaact ttaaatggta cttttcgcgt gatgacctta ccattccttc cgttgaaggg 1620  
 cttaacttcc gccacattcg ctgttacgct gacaaccagc agttaaggt gatcataagc 1680  
 ggttcacgtt ggggcggttg gtactccact tacgataaag ttgaaagtaa tgtcgaagat 1740  
 aagattttgg tcaaagatgg ttttgatcgc ttt 1773

<210> 10  
 <211> 1773  
 <212> DNA  
 <213> Artificial

<220>  
 <223> JL nucleotide sequence with tga codons changed to tgg for expression in E. coli

<400> 10  
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 aattttggta gaagctattt tatttccact tcagaaacac ccacagcagc tattcgcttc 180  
 tttggtagct gggtacggga atatgtacca gagcacccca gaagggctta cttatatgaa 240  
 attcgtgccg accaacactt ttacaatgcc cgcgcactg gggagaactt gttagattta 300  
 atgcgtcaaa gacaagtagt atttgactct ggtgatcgag aaatggcaca aatgggaatt 360  
 agagctttac gcacttcctt tgcgtatcaa cgtgaatggg ttaccgatgg tccaattgca 420  
 gcagctaattg tccgtagtgc ttggctagta gatgctgttc ccgttgaacc tggtcatgct 480  
 caccaccggg ctggtcgtgt tgtagagact actagaatta atgaaccgga aatgcacaac 540  
 cctcattatc aagagctgca aaccaagcc aatgatcaac catgggttgc aacaccagga 600  
 atagctactc ctgtacattt atcaattccc caagcagctt ccgttgctga tgtttcggaa 660  
 ggtacttccg cttcgctatc gtttgctgct cctgattgga gtccaccttc tagtaatggg 720  
 gaaaatccgc tagacaaatg cattgctggaa aagattgata actataacct acaatcctta 780  
 ccacagtacg ctagcagtgt aaaggaactg gaagatacac cagtatacct aaggggaatt 840  
 aaaacgcaaa aaacctttat gttacaagca gatccgcaaa ataacaatgt ctttttgggtc 900  
 gaagtaaacc ccaaacaaaa gtccagcttt ccccaaacca tcttcttttg ggatgtttat 960  
 caacgaattt gtctcaagga tttaactggg gcacaaatca gtctttcgct tactgccttt 1020  
 actactcagt atgctggtca gctcaaagtg caccttagtg ttagcgcggt taatgccgtg 1080  
 aaccaaagt ggaaatgac accgcaagac agtgaataa ctcagtttcg ggtctcctct 1140  
 gaactgtag gtcaaactga aaatggcttg ttctggaata ccaagagtgg tggttcacia 1200  
 cactgttgt atgtatgtcc tttgaaaaat ccacctagtg atttggaga attacaaata 1260  
 attgttgatg aatgtactac ccacgagcag tttgttacta tgcgtgcagc tagcaccttc 1320  
 tttgttgatg ttacagctagg ctggtattgg aggggttatt actatacccc acaattaagt 1380  
 ggttggtctt atcagatgaa aacaccagat ggacagatat tctatgatct aaaaacttcg 1440  
 aaaatcttct ttgtccagga caacaaaaac gtgttctttc tccataataa actcaacaaa 1500

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caaactgggtt acagctggga ttgggtagaa tggctaaaac atgacatgaa tgaggacaaa 1560
gacgaaaact ttaaattggta cttttcgcgt gatgacctta ccattccttc cgttgaaggg 1620
cttaacttcc gccacattcg ctgttacgct gacaaccagc agttaaaggt gatcataagc 1680
ggttcacggt ggggcggttg gtactccact tacgataaag ttgaaagtaa tgtcgaagat 1740
aagattttgg tcaaagatgg ttttgatcgc ttt 1773

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<210> 11

<211> 1773

<212> DNA

<213> Artificial

<220>

<223> RJL1 nucleotide sequence with tga codons changed to tgg for expression in E. coli

<400> 11

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aattttggta gaagctatTTt tatttccact tcagaaacac ccacagcagc tattcgcttc 180
tttggttagct ggttacggga atatgtacca gagcacccca gaagggttta cttatatgaa 240
attcgtgccg accaacactt ttacaatgcc cgcgccactg gggagaactt gtttagattta 300
atgcgtcaaa gacaagtagt atttgactct ggtgatcgag aaatggcaca aatgggaatt 360
agagctttac gcacttcctt tgcgtatcaa cgtgaatggg ttaccgatgg tccaattgca 420
gcagctaattg tccgtagtgc ttggctagta gatgctgttc ccgttgaacc tggatcatgct 480
caccacccgg ctggtcgtgt tgtagagact actagaatta atgaaccgga aatgcacaac 540
cctcattatc aagagctgca aacccaagcc aatgatcaac catgggttgc aacaccagga 600
atagctactc ctgtacattt atcaattccc caagcagctt ccgttgctga tgtttcggaa 660
ggtaacttccg cttcgctatc gtttgctgct cctgattgga gtccaccttc tagtaatggg 720
gaaaatccgc tagacaaatg cattgcggaa aagattgata actataacct acaatcctta 780
ccacagtacg ctagcagtgt aaaggaactg gaagatacac cagtatacct aaggggaatt 840
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cacgatttgt atgtatgtcc ttgaaaaat ccacctagtg atttggaaga.attacaaata 1260 ...  
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 ttgttgatg ttcagctagg ctggtattgg aggggttatt actatacccc acaattaagt 1380  
 ggttggtcctt atcagatgaa aacaccagat ggacagatat tctatgatct aaaaacttcg 1440  
 aaaatcttct ttgtccagga caacccaaac gtgttctttc tccataataa actcaacaaa 1500  
 caaactgggtt acagctggga ttgggtagaa tggctaaaac atgacatgaa tgaggacaaa 1560  
 gacgaaaact ttaaatggta cttttcgcgt gatgacctta ccattccttc cgttgaaggg 1620  
 cttaacttcc gccacattcg ctgttacgct gacaaccagc agttaaagggt gatcataagc 1680  
 ggttcacggt ggggcgggtg gtactccact tacgataaag ttgaaagtaa tgtcgaagat 1740  
 aagatttttg tcaaagatgg ttttgatcgc ttt 1773

<210> 12  
 <211> 24  
 <212> DNA  
 <213> Artificial

<220>  
 <223> Oligonucleotide primer

<400> 12  
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<210> 13  
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<220>  
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<400> 13  
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<210> 14  
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<220>  
 <223> Oligonucleotide primer

<400> 14  
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<210> 15  
 <211> 27  
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<213> Artificial

<220>

<223> Oligonucleotide primer

<400> 15

cgtagtgctt ggctagtaga tgctggt

27

<210> 16

<211> 23

<212> DNA

<213> Artificial

<220>

<223> Oligonucleotide primer

<400> 16

cctgggtgttg gcaaccatgg ttg

23

<210> 17

<211> 23

<212> DNA

<213> Artificial

<220>

<223> Oligonucleotide primer

<400> 17

gatcaaccat ggttgccaac acc

23

<210> 18

<211> 24

<212> DNA

<213> Artificial

<220>

<223> Oligonucleotide primer

<400> 18

aaggtggact ccaatcaggg cacg

24

<210> 19

<211> 24

<212> DNA

<213> Artificial

<220>

<223> Oligonucleotide primer

<400> 19

cgtgccctga ttggagtcca cctt

24

<210> 20

<211> 23

<212> DNA

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<220>  
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<400> 20  
gcggtgtcat tttccacttt tgg 23

<210> 21  
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<220>  
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<400> 21  
ccaaaagtgg aaaatgacac cgc 23

<210> 22  
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<220>  
<223> Oligonucleotide primer

<400> 22  
ggtattccag aacaagccat tt 22

<210> 23  
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<212> DNA  
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<220>  
<223> Oligonucleotide primer

<400> 23  
gcttggttctg gaataccaag agtg 24

<210> 24  
<211> 21  
<212> DNA  
<213> Artificial

<220>  
<223> Oligonucleotide primer

<400> 24  
ataacccta taccagcta g 21

<210> 25  
<211> 59  
<212> DNA  
<213> Artificial



<220>  
<223> Oligonucleotide primer

<400> 25  
gctggtattg gaggggttat tactataccc cacaattaag tggttggtct tatcagatg 59

<210> 26  
<211> 24  
<212> DNA  
<213> Artificial

<220>  
<223> Oligonucleotide primer

<400> 26  
ccattctacc caatcccagc tgta 24

<210> 27  
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<212> DNA  
<213> Artificial

<220>  
<223> Oligonucleotide primer

<400> 27  
tacagctggg attgggtaga atgg 24

<210> 28  
<211> 24  
<212> DNA  
<213> Mycoplasma pneumoniae

<400> 28  
ttttttaaaaa tgccaaatcc tggt 24

<210> 29  
<211> 20  
<212> DNA  
<213> Mycoplasma pneumoniae

<400> 29  
aatgtccgta gtgcttgact 20

<210> 30  
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<220>  
<223> Modified M129/B9 sequence

<400> 30  
aatgtccgta gtgcttgact 20

<210> 31  
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<400> 31  
agccaagcac tacggacatt 20  
  
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tgcttgacta gtagatgctg tt 22  
  
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tgcttgacta gtagatgctg tt 22  
  
<210> 34  
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<212> DNA  
<213> Mycoplasma pneumoniae  
  
<400> 34  
atgattgcca acaccagg 18  
  
<210> 35  
<211> 18  
<212> DNA  
<213> Artificial  
  
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<223> Modified M129/B9 sequence  
  
<400> 35  
atgggtgcca acaccagg 18  
  
<210> 36  
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<212> DNA  
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<400> 36  
cctggtgttg gcaaccat 18

<210> 37  
<211> 18  
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<400> 37  
accatgattg ccaacacc 18

<210> 38  
<211> 18  
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<220>  
<223> Oligonucleotide primer

<400> 38  
accatggttg ccaacacc 18

<210> 39  
<211> 19  
<212> DNA  
<213> Mycoplasma pneumoniae

<400> 39  
cctgattgaa gtccacctt 19

<210> 40  
<211> 19  
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<220>  
<223> Modified M129/B9 sequence

<400> 40  
cctgattgga gtccacctt 19

<210> 41  
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<220>  
<223> Oligonucleotide primer

<400> 41  
aagggtggact ccaatcagg 19

<210> 42  
<211> 18

<212> DNA  
<213> *Mycoplasma pneumoniae*

<400> 42  
cgtgccctga ttgaagtc 18

<210> 43  
<211> 18  
<212> DNA  
<213> Artificial

<220>  
<223> Oligonucleotide primer

<400> 43  
cgtgccctga ttggagtc 18

<210> 44  
<211> 20  
<212> DNA  
<213> *Mycoplasma pneumoniae*

<400> 44  
aaagtgaaaa atgacaccgc 20

<210> 45  
<211> 20  
<212> DNA  
<213> Artificial

<220>  
<223> Modified M129/B9 sequence

<400> 45  
aaagtggaaa atgacaccgc 20

<210> 46  
<211> 20  
<212> DNA  
<213> Artificial

<220>  
<223> Oligonucleotide primer

<400> 46  
gcggtgtcat tttccacttt 20

<210> 47  
<211> 20  
<212> DNA  
<213> *Mycoplasma pneumoniae*

<400> 47  
caaaagtgaa aaatgacacc 20

<210> 48  
 <211> 20  
 <212> DNA  
 <213> Artificial  
  
 <220>  
 <223> Oligonucleotide primer  
  
 <400> 48  
 caaaagtgga aaatgacacc 20  
  
 <210> 49  
 <211> 22  
 <212> DNA  
 <213> Mycoplasma pneumoniae  
  
 <400> 49  
 aaatggcttg ttctgaaata cc 22  
  
 <210> 50  
 <211> 22  
 <212> DNA  
 <213> Artificial  
  
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 <400> 50  
 aaatggcttg ttctggaata cc 22  
  
 <210> 51  
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 gcttggttctg aaataccaag agt 23  
  
 <210> 52  
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 <400> 52  
 gcttggttctg gaataccaag agt 23  
  
 <210> 53  
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 <212> DNA  
 <213> Mycoplasma pneumoniae  
  
 <400> 53  
 taggctggta ttgaaggggt 20

<210> 54  
 <211> 20  
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<220>  
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<400> 54  
 taggctggta ttggaggggt 20

<210> 55  
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<220>  
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<400> 55  
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<210> 56  
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<400> 56  
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<210> 57  
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<220>  
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<400> 57  
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<210> 58  
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 <212> DNA  
 <213> Mycoplasma pneumoniae

<400> 58  
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<210> 59  
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 <213> Artificial

<220>  
<223> Modified M129/B9 sequence

<400> 59  
tacagctggg attgggtaga a 21

<210> 60  
<211> 21  
<212> DNA  
<213> Artificial

<220>  
<223> Oligonucleotide primer

<400> 60  
ttctacccaa tcccagctgt a 21

<210> 61  
<211> 21  
<212> DNA  
<213> Mycoplasma pneumoniae

<400> 61  
tacagctggg attgagtaga a 21

<210> 62  
<211> 21  
<212> DNA  
<213> Artificial

<220>  
<223> Oligonucleotide primer

<400> 62  
tacagctggg attgggtaga a 21

<210> 63  
<211> 28  
<212> DNA  
<213> Mycoplasma pneumoniae

<400> 63  
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<210> 64  
<211> 28  
<212> DNA  
<213> Artificial

<220>  
<223> Modified M129/B9 sequence

<400> 64  
gatcgctttt agcgaggatc ctttaacg 28

<210> 65  
 <211> 28  
 <212> DNA  
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Phe Gly Arg Ser Tyr Phe Ile Ser Thr Ser Glu Thr Pro Thr Ala Ala  
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ccncartayg cnwsnwsngt naargarytn gargayacnc cngtntayyt nmngngnath	840
aaracncara aracnttyat gytnccargcn gayccncara ayaayaaygt nttyytngtn	900
gargtnaayc cnaarcaraa rccnwsntty ccncaracna thttytytg ggaygtntay	960
carmgnatht gyytnaarga yytnacnggn gcncarathw snytnwsnyt nacngcntty	1020
acnacncart aygcnggnca rytnaargtn cayytnwsng tnwsngcngt naaygcngtn	1080
aaycaraart ggaaratgac nccncargay wsngcnatha cncarttymg ngtnwsnwsn	1140
garytnytng gncaracnga raayggnytn wsnmgnaaya cnaarwsngg nggnwsncar	1200
caygayytn aygtntgycc nytnaaraay ccnccnwsng ayytngarga rytncarath	1260
athgtngayg artgyacnac ncaygcncar ttygtnacna tgmngcngc nwsnacntty	1320
ttygtngayg tncarytngg ntggataytg mgnggntayt aytayacncc ncarytnwsn	1380
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ytnaayttym gncayathmg ntgytaygcn gayaaycarc arytnaargt nathathwsn	1680
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1773